

## Bankhead-Coley Cancer Research Program

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*2011 Program  
Bridge  
(1 year project)*

**Project Title:** Combined Photoacoustic and Diffuse Optical Tomography

**Project Summary:** Breast cancer remains a major public health problem in Florida and the United States. There are ~200,000 new cases of breast cancer diagnosed in the United States, making it the most common cancer affecting women. Early detection and diagnosis of breast cancer is very important as early stage breast cancer is much easier to treat and more easily cured than breast cancer diagnosed at more advanced stages. Currently available imaging modalities (mammography and ultrasound) are very limited in their ability to detect and diagnose early breast cancer. New, effective approaches to early detection and diagnosis of human breast cancer are desperately needed. In this interdisciplinary proposal, we seek to engineer a novel human breast imaging system that uses safe near infrared light and sound waves (Combined Photoacoustic and Diffuse Optical Tomography) to diagnose breast cancer. Hardware and software development will be the early focus of the project. The novel combined imaging system will then be tested in human breast phantoms to optimize performance. Finally, for the first time, the combined imaging system will be used to evaluate breast masses in human subjects. It is anticipated that data obtained from this work will form the basis of a future successful federal grant application that will allow continued development of this novel combinatorial imaging modality towards clinical application for ultimately reducing suffering and improving survival related to human breast cancer.